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CHANG, AUDREY Y	
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/990,237	Applicant(s) SUGANUMA, HIROSHI	
	Examiner Audrey Y. Chang	Art Unit 2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 August 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 November 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Remark

- This Office Action is in response to applicant's amendment filed on August 30, 2006 which ahs been entered into the file.
- By this amendment, the applicant has amended claims 1, 3, 6, 7, 8, and 12-14.
- Claims 1-17 remain pending in this application.
- The rejections of the claims under 35 USC 112, first paragraph based on the newly added matters, set forth in the previous Office Action, are withdrawn in response to applicant's amendment.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. **Claims 1-5, 7-15 and 17 are rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claims 1, and 8 have been amended to include the phrase "a Fourier transformation section that performs Fourier transformation of image data received from an external source" and **claim 7 has been amended** to include the feature "means for receiving image data from an external source ... to Fourier transformation of said image data".

The specification fails to teach the "Fourier transformation of image data" is a transformation function **from what to what**. Transformation must be transformation from one thing to another however the specification fails to teach such which make the transformation non-enable. A Fourier transformation

is a **mathematical** transformation of a function from one space (such as spatial space) to another space (such as wave number space), it is not clear what kind of the transformation is being done here and the transformed image data is in *what domain space*. It is important to know such since the image data function in one domain space will have *recognizable* image in a different domain space will not have *recognizable* image. It is therefore not clear if the transformed image data is recognizable or not by the naked eyes, the claims and the specification FAIL to teach such to make it clear and to make any Fourier transformed image be viewed as recognizable image.

The specification only gives a general equation such as a(x): A(X) = H(X) exp[io(X)], yet without giving **physical means** for **each** of the functions to make the Fourier transformation physically meaningful. If a(x) is the function for the amplitude of the wavefront generated from the GLV and o(x) is the phase given to the light wave reflected from the GLV, then for any light modulated by the GLV, it implicitly involves a Fourier transformation, since the wavefront of the light modulated by the GLV has both amplitude and phase information modulated by the GLV.

Clarifications are certainly required.

Claim Objections

3. **Claims 1-17 are objected to because of the following informalities:**

(1). It is not clear what is this Fourier transformation and what is the transformed image data as relate to image data? Why does the transformation needed? Can this *transformed* image be *viewed* by the observer? What is this "spatial modulator" and does it *modulate* the light or not? What are these "modulation elements" how do they relate to the spatial modulator recited before? Furthermore, how does this transformed image data relate to the rest of the elements of the display apparatus? The image display apparatus without the controller, only discloses to scan **the light** (what is this light?) back and

forth or something. No workable image display apparatus has been disclosed in the claims. **This objection has been included in the previous Office Action.**

(2). The phrase "scan unit axis" recited in various claims is confusing and indefinite since it is not clear if this referred to the scanning direction or the rotational axis of the scanning unit. *This phrase has been objected in the previous Office Action.*

(3). The phrase "Fourier surface" recited in amended claim 6 is confusing since it is not clear what is this phrase referred to? Is this referred to the "Fourier plane" which is the focal plane of the Fourier lens or the surface of the Fourier lens? Figures 4 and 5, fails to disclose that the diffuser is at the focal plane of the Fourier lens. It is therefore not clear what is considered to be this Fourier surface? *It is being examined as any surface that at the downstream of the Fourier transformation lens. This phrase has been objected in the previous Office Action, but the applicant fails to respond to clarify the issue.*

(4). The phrase "so that the light from the light source is reflected by the polygon mirror and the hologram device in this order" recited in claim 9 is confusing since it is not clear how does this scan unit and *this order* is possible to scan the light in a first direction as required by the based claim 1. It appears that the light will be scanned in at least two directions. *This phrase has been objected in the previous Office Action, but the applicant fails to respond to clarify the issue.*

(5). The amended phrase "the modulation device" recited in claim 14 is confusing and indefinite since it lacks proper antecedent basis from its based claim.

(6). Claims 1, 7 and 8 have been amended to include the phrase "image data ... received from an external source". It is not clear the "external" is defined with respect to what. One skilled in the art would know that no display device or the modulation device is capable of "generating image data" from its own, the image data has to come from "external source", as not from itself.

The claim language as stands now are *confusing* and the elements in the claims are *loosely related to each other* that fail to provide **logical relationship** to makes the scopes of the claims are clear and

indefinite. The applicant is *respectfully requested* to correct **all** the discrepancies and errors in the claims to make them in comply with the requirements of 35 USC 112, paragraphs.

Appropriate correction is required.

Drawings

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, **the scanning of the image light by rotating the modulation device as recited in the amended claims 14** must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. **Claims 1 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Bloom et al (PN. 6,215,579) in view of the patent issued to Liu (PN. 6,043,652).**

Bloom et al teaches an *image display system* (400, Figure 14) wherein the system is comprised of a *light source having LEDs* (404R, 404G, 404B) for *generating laser beams having* wavelengths in predetermined ranges of red, green and blue color. The laser beams illuminate a *Grating Light Valve* (402), which is an *one-dimensional spatial light modulator*, (please see Figure 10 for its one dimensional arrangement) for modulating the laser beams. The modulated laser beams are then *scanned* by a *scanning mirror* (432) to the *direction* and then the location of an observer (434) for displaying **an image,** (please see Figure 14, and columns 7-12). Bloom et al teaches that the one-dimensional grating light valve has a plurality of *one-dimensionally arrayed elements* (200, Figures 7-18) that each of the elements has a *top surface* defined between the post position (110) and the top surface is selected to move upward and downward for modulating the light. The elements are *selectively* driven by applying the voltage and which means they could be independently driven.

With regard to the features include a controller including a clock, a Fourier transformation section and a spatial modulator section, **and the feature** to include the feature concerning the connection of the clock to the grating light valve and driving the grating light vale based on the timing of the reference signal generated from clock, recited in claim 1, Bloom et al teaches the followings.

Bloom et al teaches the display apparatus comprises a *control circuitry* (440, Figure 14) that is arranged to receive video data or image data *coupled* to the GLV array for using the image data or video data to *operate* the elongated GLV elements (200), which therefore includes the "*spatial modulation section*" for driving the modulation elements or the GLV elements (200). The electronic control circuitry

also is *coupled* to the scanning mirror drive unit (436) to *synchronize* the display of sequential lines which is a cooperation between the GLV and scanning mirror, this means certain kind of *clock* with *referee signal* is included for achieving this synchronization, (please see column 10, lines 43-59). This reference however does not teach about having a Fourier transformation section for Fourier transforming the image data. However **it is not clear** what is this transformation for and how does it affect the image data. This transformation is **therefore being examined** as arbitrary *image processing step.* It is very well known in the art to apply Fourier transformation on image data in the process of processing the image data to better fit for the display purpose as demonstrated by **Liu** wherein a Fourier transformation (224, Figure 5) is performed in the process of processing the image data before it is fed to the display device (230, Figure 5). Fourier transformation has the advantage of reducing data points for processing. It would then have been obvious to one skilled in the art to apply the teachings of **Liu** to include such process in the display apparatus of **Bloom** et al for the advantage of reducing data points for processing before being displayed by the GLV so that better image quality can be achieved.

Claim 1 has been amended to include the phrase that the image data is received from an external source. It is implicitly true that the image data has to come from "external source" since the GLV cannot create image data by itself.

7. **Claims 7-8 and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Kajiki (PN. 5,694,235) in view of the patent issued to Liu (PN. 6,043,652).**

Kajiki teaches a *three dimensional image display apparatus*, (Figure 9) that is comprised of a *light source array* (17) for radiating coherent light, a *spatial light modulator* (19), that has the function of spatially modulating light of the source array in a *one-dimensional fashion*, (please see the one-dimensional arrangement of the modulated light from the modulator) and a *vertical scanning unit* (4) and a *polygon mirror scanning unit* (3) for scanning the modulated light to a predetermined direction of the

observer (21) to enable three dimensional image observation, (please see columns 7 and 9). Kajiki teaches that the *vertical* scanner (4) and a *horizontal* scanner (3), which is a *polygonal mirror*, have scanning axes that are orthogonal to each other. The horizontal scanner (3) allows the horizontal parallax effect of the image is established and the vertical scanner (4) allows the vertical parallax effect of the image is established, (please see Figure 4). It is implicitly true that the directions of the scanning from both of the scanners, which referred to the actual direction of the light after the scanners, are also orthogonal to each other and to the modulation elements, for creating two-dimensionally *extended* image at the viewer position. With regard to claim 13, Kajiki teaches that the two scanners have different scanning speeds, (please column 9, lines 45-54).

Claim 7 has been amended to include the feature "means for receiving image data from an external source". Kajiki teaches that an image receiver such as video recorder (12, Figure 14) is used as means for receiving image data from an external source.

Claim 8 has been amended to recite the phrase "Fourier transforming image data received from an external source". Kajiki teaches that an image receiver such as video recorder (12, Figure 14) is used as means for receiving image data from an external source.

The feature concerning the "modulating is controlled in part according to a Fourier transformation of said image data" is indefinite and is rejected for the reasons stated above and it can only be examined in the broadest interpretation. This transformation is therefore being examined as arbitrary image processing step. It is very well known in the art to apply Fourier transformation on image data in the process of processing the image data to better fit for the display purpose as demonstrated by **Liu** wherein a Fourier transformation (224, Figure 5) is performed in the process of processing the image data before it is fed to the display device (230, Figure 5). Fourier transformation has the advantage of reducing data points for processing. It would then have been obvious to one skilled in the art to apply the teachings of **Liu** to include such process in the display apparatus of Kajiki for the advantage of reducing

data points for processing before being displayed by the spatial modulator so that better image quality can be achieved.

With regard to claim 14, the claim has been amended to include the phrase that the scanning step includes the rotation of the modulation device". This references do not teach such explicitly. However it is known in the art that buy moving the modulator the image light modulated by the modulator can be scanned or directed to desired direction. It would then have been obvious to one skilled in the art to modify the arrangement by moving the modulator to achieve the scanning of the image light to achieve the desired image viewing, for the benefit of reducing the elements used in the system.

8. Claims 1-5 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Kajiki (PN. 5,694,235) in view of the patents issued to Bloom et al (PN. 6,215,579) and Liu (PN. 6,043,652).

Kajiki teaches a *three dimensional image display apparatus*, (Figure 9) that is comprised of a *light source array* (17) for radiating coherent light, a *spatial light modulator* (19), that has the function of modulating light of the source array in a *one-dimensional fashion*, (please see the one-dimensional arrangement of the modulated light from the modulator) and a *vertical scanning unit* (4) and a *polygon mirror scanning unit* (3) for scanning the modulated light to a predetermined direction of the observer (21) to enable three-dimensional image observation, (please see columns 7 and 9).

This reference has met all the limitations of the claims with the exception that it does not teach explicitly that the spatial light modulator that modulates light in one-dimensional manner is a grating light valve (GLV) and does not teach explicitly that it has a plurality of one-dimensionally arrayed elements having top surfaces and the entire top surface of each elements is selectively moves upward and downward in the operation of the display. However grating light valve (GLV) is one of well known and widely used spatial light modulators in the art, as explicitly taught by **Bloom**. **Bloom** et al teaches an

image display system (400, Figure 14) wherein the system is comprised of a *light source having LEDs* (404R, 404G, 404B) for *generating laser beams to* illuminate a *Grating Light Valve* (402), which is an *one-dimensional spatial light modulator*, (please see Figure 10 for its one dimensional arrangement) for modulating the laser beams. The modulated laser beams are then *scanned* by a *scanning mirror* (432) to the *direction* and then the location of an observer (434) for displaying **an image**, (please see Figure 14, and columns 7-12). **Bloom** et al teaches that the *one dimensional grating light valve* has a plurality of *one-dimensionally arrayed elements* (200, Figures 7-18) that each of the elements has a *top surface* defined between the post position (110) and the top surface is selected to move upward and downward for modulating the light. The elements are *selectively* driven by applying the voltage and which means they could be independently driven as desired. It would then have been obvious to one skilled in the art to apply the teachings of **Bloom** to make the one dimensional modulator of **Kajiki** a grating light valve having the structure explicitly stated above for the benefit of allowing the modulation of the light from the light source array with greater efficiency and control which therefore ensure the image display quality.

Claim 1 recites the features include a controller including a clock, a Fourier transformation section and a spatial modulator section. **Claim 1 has further been amended** to include the feature concerning the connection of the clock to the grating light valve and driving the grating light vale based on the timing of the reference signal generated from clock .

Bloom et al teaches the display apparatus comprises a *control circuitry* (440, Figure 14) that is arranged to receive video data or image data *coupled* to the GLV array for using the image data or video data to *operate* the elongated GLV elements (200), which therefore includes the "*spatial modulation section*" for driving the modulation elements or the GLV elements (200). The electronic control circuitry also is *coupled* to the scanning mirror drive unit (436) to *synchronize* the display of sequential lines which is a cooperation between the GLV and scanning mirror, this means certain kind of *clock* with *referee signal* is included for achieving this synchronization, (please see column 10, lines 43-59). This reference

however does not teach about having a Fourier transformation section for Fourier transforming the image data. However it is not clear what is this transformation for and how does it affect the image data. This transformation is therefore being examined as arbitrary image processing step. It is very well known in the art to apply Fourier transformation on image data in the process of processing the image data to better fit for the display purpose as demonstrated by **Liu** wherein a Fourier transformation (224, Figure 5) is performed in the process of processing the image data before it is fed to the display device (230, Figure 5). Fourier transformation has the advantage of reducing data points for processing. It would then have been obvious to one skilled in the art to apply the teachings of **Liu** to include such process in the display apparatus of Bloom et al for the advantage of reducing data points for processing before being displayed by the GLV or modulator so that better image quality can be achieved.

With regard to claims 2 and 3, Kajiki teaches that the scanning unit include a *vertical* scanner (4) and a *horizontal* scanner (3), which is a *polygonal mirror*, wherein the two scanners has scanning axes that are orthogonal to each other. The horizontal scanner (3) allows the horizontal parallax effect of the image is established and the vertical scanner (4) allows the vertical parallax effect of the image is established, (please see Figure 4). It is implicitly true that the directions of the scanning from both of the scanners, which referred to the actual direction of the light after the scanners, are also orthogonal to each other and to the modulation elements for creating two-dimensionally *extended* image at the viewer position.

With regard to claim 4, Kajiki teaches to use a *diffusion plate* for reproducing and displaying the stereoscopic image to the observer.

With regard to claim 11, Kajiki teaches that the vertical scanner (4) includes a galvano mirror (8) and the horizontal scanner (3) may also include a galvano mirror, (please see Figure 4, column 9, lines 45-54).

With regard to claim 12, Kajiki teaches explicitly that *collimator lens* (22, Figure 11 or 14a, 14b in Figure 13) is used to make the modulated light from the modulator *collimated* to each other before entering the scanning units. The modulated light after being scanned is focused and Fourier transformed by the lens (2) and is directed to a *diffusion plate* (20) for allowing the image being displayed.

9. Claims 9-10 and claim 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patents issued to Kajiki, Bloom et al and Liu as applied to claim 1 above, and further in view of the patent issued to Burr et al (PN. 5,550,779).

The three dimensional image display apparatus taught by **Kajiki** in combination of the teachings of **Bloom et al and Liu** have met all the limitations of the claims. Kajiki teaches that the scanning system comprises galvano mirror and polygonal mirror but it does not teach explicitly that is may also comprised staged mirror. The feature concerning the "volume hologram" is really not clear since the specification and the claims fail to give the proper structural relationship of the hologram with other elements of the display apparatus to determine the **function** of the volume hologram. It can only be examined with the broadest interpretation. **Burr** in the same field of the endeavor teaches a staged mirror, (14, 16 or 54) which can be diffractive grating elements (or therefore an holographic element), that is comprised of staged reflective elements, (please see Figures 2-4, 8 and 11) for directing light beam to different vertical direction. It would then have been obvious to one skilled in the art to modify the structure of Kajiki to use staged mirror as alternative means for scanning the light for the benefit of allowing more efficient control of the scanning of the light beams. The order of the scanning it not crucial since both the instant application and the cited Kajiki reference teaches to use the scanners to provide two dimensional image from one dimensional modulator.

10. **Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Kajiki (PN. 5,694,235) in view of the patents issued to Bloom et al (PN. 6,215,579)**

Kajiki teaches a *three dimensional image display apparatus*, (Figure 9) that is comprised of a *light source array* (17) for radiating coherent light, a *spatial light modulator* (19), that has the function of modulating light of the source array in a *one-dimensional fashion*, (please see the one-dimensional arrangement of the modulated light from the modulator) and a *vertical scanning unit* (4) and a *polygon mirror scanning unit* (3) for scanning the modulated light to a predetermined direction of the observer (21) to enable three-dimensional image observation, (please see columns 7 and 9). Kajiki teaches explicitly that *collimator lens* (22, Figure 11 or 14a, 14b in Figure 13) is used to make the modulated light from the modulator *collimated* to each other. The modulated light after being scanned is focused and **Fourier transformed** by the lens (2) and is directed to a *diffusion plate* (20) for allowing the image being displayed. The diffusion plate is placed at the downstream of the Fourier transformation lens (2) and it is at the "surface" of the Fourier transformation lens in the sense of downstream of the lens.

This reference has met all the limitations of the claims with the exception that it does not teach explicitly that the spatial light modulator that modulates light in one-dimensional manner is a grating light valve (GLV) and does not teach explicitly that it has a plurality of one-dimensionally arrayed elements having top surfaces and the entire top surface of each elements is selectively moves upward and downward in the operation of the display. However grating light valve (GLV) is one of well known and widely used spatial light modulators in the art, as explicitly taught by **Bloom**. **Bloom** et al teaches an *image display system* (400, Figure 14) wherein the system is comprised of a *light source having LEDs* (404R, 404G, 404B) for *generating laser beams to* illuminate a *Grating Light Valve* (402), which is an *one-dimensional spatial light modulator*, (please see Figure 10 for its one dimensional arrangement) for modulating the laser beams. The modulated laser beams are then *scanned* by a *scanning mirror* (432) to the *direction* and then the location of an observer (434) for displaying **an image**, (please see Figure 14,

and columns 7-12). **Bloom** et al teaches that the *one dimensional grating light valve* has a plurality of *one-dimensionally arrayed elements* (200, Figures 7-18) that each of the elements has a *top surface* defined between the post position (110) and the *entire* top surface is selected to move upward and downward for modulating the light. The elements are *selectively* driven by applying the voltage and which means they could be independently driven as desired. It would then have been obvious to one skilled in the art to apply the teachings of **Bloom** to make the one dimensional modulator of **Kajiki** a grating light valve having the structure explicitly stated above for the benefit of allowing the modulation of the light from the light source array with greater efficiency and control which therefore ensure the image display quality.

11. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over the patents issued to Kajiki, and Bloom et al as applied to claim 6 above, and further in view of the patent issued to Burr et al (PN. 5,550,779).

The three dimensional image display apparatus taught by **Kajiki** in combination of the teachings of **Bloom et al** have met all the limitations of the claims. Kajiki teaches that the scanning system comprises galvano mirror and polygonal mirror but it does not teach explicitly that is may also comprised staged mirror. **Burr** in the same field of the endeavor teaches a staged mirror, (14, 16 or 54) which can be diffractive grating elements (or therefore an holographic element), that is comprised of staged reflective elements, (please see Figures 2-4, 8 and 11) for directing light beam to different vertical direction. It would then have been obvious to one skilled in the art to modify the structure of Kajiki to use staged mirror as alternative means for scanning the light for the benefit of allowing more efficient control of the scanning of the light beams.

12. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over the patents issued to Kajiki, and Liu as applied to claim 7 above, and further in view of the patent issued to Burr et al (PN. 5,550,779).

The three dimensional image display apparatus taught by **Kajiki** in combination of the teachings of **Liu** have met all the limitations of the claims. Kajiki teaches that the scanning system comprises galvano mirror and polygonal mirror but it does not teach explicitly that is may also comprised staged mirror. **Burr** in the same field of the endeavor teaches a staged mirror, (14, 16 or 54) which can be diffractive grating elements (or therefore an holographic element), that is comprised of staged reflective elements, (please see Figures 2-4, 8 and 11) for directing light beam to different vertical direction. It would then have been obvious to one skilled in the art to modify the structure of Kajiki to use staged mirror as alternative means for scanning the light for the benefit of allowing more efficient control of the scanning of the light beams.

Response to Arguments

13. Applicant's arguments filed August 30, 2006 have been considered but they are not persuasive. The amended claims have been fully considered and they are rejected for the reasons stated above.

14. In response to applicant's arguments which state that "Liu discloses storing and transformed data and converting the data to a format for display but does not show or suggest using the stored transformed data to control a modulator" which therefore differs from the instant application the examiner respectfully disagrees for the reasons stated below. Just like the applicant's admission, the cited Liu reference teaches a *data processing method* including Fourier transforming the image data to make it have a **format fit** for display on a monitor, (which may certainly includes a spatial light modulator), (please note the applicant does admit this in its previous response filed on February 8, 2006) . In order for the transformed image to be displayed on the spatial light modulator, the modulator has to be *controlled* according to the

transformed image data, for other wise the image simply cannot be displayed. This is true for any spatial light modulator or monitor. **The applicant however disagrees that the Fourier transformation data is used to control the modulator.** The examiner respectfully disagrees for the reasons stated about for the interpretation of the term "control", and also for the reasons stated below. Firstly, the specification fails to disclose the **Fourier transformation** is the transformation of WHAT? Fourier transformation is just an ABSTRACT mathematical function that without physical meaning of its own. This makes the "control" of the modulator indefinite. The specification only gives a brief "Fourier transformation" having the physical functions concerning the amplitude a(x) and phase o(x) of the light wave modulated by the modulator. This means that ANY modulator that is capable of modulating light beam to have certain amplitude and phase function, is modulated by a modulator driven in response to Fourier transformation of image data, since one **can always define a Fourier transformation** using the phase function and the amplitude function of the modulated wave accordingly. This step is therefore implicitly met for any modulator.

Furthermore, the applicant is respectfully noted, since the specification and the claims fail to disclose what is this Fourier transformation and what nature of the transformation is being performed here, this feature therefore cannot be defined here with any means other than arbitrary image data processing. Image data processing using Fourier transformation technique is extremely well known in the art. The Fourier transformation claimed here is only one data processing step for allowing the image data to be displayed on the grating light valve or spatial light modulator. Any image displayed on the spatial light modulator therefore can implicitly assume to have been processed through image data processing steps including Fourier transformation.

Conclusion

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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